DAY (F. L.)

TWENTY-SIX CASES OF INTUBATION OF THE LARYNX.

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TWENTY-SIX CASES OF INTUBATION OF THE LARYNX.

BY FRANK L. DAY, M.D., PROVIDENCE, R. I.

Up to the first of January, 1894, since October 10, 1890, I have seen (each time in consultation with one or more physicians) 31 cases of laryngeal obstruction. These do not include four cases where the child had died previous to my arrival, once each with Drs. Godding, Carpenter, Moore and McKenna, nor one case with Dr. Acres, where operation was refused.

Of the 31 cases seen, in five operation was not advised; of these, three recovered and two died, as follows:

One child, age six, with Dr. Hanaford, of Apponaug, recovered.

Two with Dr. G. E. Carpenter, in East Providence, recovered.

One case seen with Dr. H. P. Abbott was instructive. Male, age five-and-a-half years. A septic case where there had been laryngeal symptoms for twelve hours. Seen by Dr. Abbott but a few hours before my visit. As the dyspnœa was but moderate, we decided to try steam-inhalation and other medical means for a while. Everything went on well, until twelve hours later the parents took him away from the steam and saw him choke to death without notifying Dr. Abbott, as had been agreed if anything went wrong. The lesson is this: Environment is an important factor in estimating the advisability of operation; and in another case where competent nursing and care was not available, I should operate, even where the dyspnœa was very moderate.

One case seen with Dr. S. A. Welch. A child of two years had been sick but a few hours, a septic case with only moderate obstruction. We decided first to initiate medical means, and saw marked improvement for some hours. The child died of sepsis within twenty-four hours.

In twenty-six cases operation was advised, and these are reported in the table which accompanies this paper.

This series is far too small to be, by itself, of any statistical value, but can only go to help make up, with the reports of others, the great mass of statistics.

Nearly every case served to open up suggestions or to enforce well-recognized points, and some of them I have appended to this report.

Case 1. Here the child's strength had been nearly exhausted by vomiting from repeated doses of ipecac, persisted in the entire night previous to Dr. Munro's first visit, by advice of the former attendant, an uneducated man. It is not the inexperienced only, who even to-day, when called to a case of diphtheritic croup, administer an emetic, as often as otherwise to satisfy the family. There may be cases where a single emetic dose may be useful in helping the expulsion of membrane; but to persist in the use of emetics, or to give them in a routine way, seems to me unjustifiable and inexcusable. I believe the heart-failure in this case is attributable to the weakness induced by emesis.

Case 2. This is the only case where the dyspnœa was not relieved, at least temporarily, by the tube. At first a three-to-four-year tube was inserted, quickly removed, and a five-to-seven-year tube at once introduced. Neither gave relief, and tracheotomy was at once done, partially relieving the breathing for a time. This case serves to emphasize what has been repeatedly said, that the tracheotomy instruments should always be at hand.

Case	Date	Attending Physician	Sex	Age	Duration before Intubation		Complications before Operation.	Nasal Symptoms	Albumen in Urine	Size of Tube	Relief to Dyspnœa	Dysphagia	Cause of Death	Results
					General Symptoms	Laryngeal Symptoms								
1	Oct. 10, 1890	Dr. W. L. Munro	M.	5½	3 days	1 day	Hyperemesis	No	....	5–7 yr.	Complete	None	Heart failure	Death 29 1-3 hours after operation, sudden and unexpected
2	Nov. 7, 1890	Dr. Acres Dr. J. W. Mitchell	M.	3¼	3 days	3 days	General bronchitis	No	....	3–4 yr. 5–7 yr.	No	....	Extension	Tracheotomy done as intubation gave no relief. Death in 27 hours
3	Nov. 19, 1890	Dr. H. O. Brown	M.	3	Several days	30 hours	.....	Profuse epistaxis	Yes	3–4 yr.	Complete	Slight	Extension	Death 57 2-3 hours after operation
4	Mar. 14, 1891	R. I. Hospital Dr. G. L. Collins	M.	4	2 weeks	2 weeks	Total suppression of urine for 24 hours	....	Suppression	3–4 yr.	Complete	None	Uræmia	Death after 18½ hours
5	July 6, 1891	Dr. J. W. C. Ely	F.	5	24 hours	24 hours	Bronchitis	No	No	5–7 yr.	Complete	Slight	. .....	Recovery. Wore tube 4¾ days
6	July 10, 1891	R. I. Hospital Dr. C. M. Godding	M.	3	6 days	24 hours	Sepsis	Yes	Yes	5–7 yr.	Complete	Much at first None later	.....	Recovery. Wore tube 10 days
7	July 16, 1891	R. I. Hospital Dr. C. M. Godding	F.	3	4 days	.....	.....	No	Yes	3–4 yr.	Complete	Slight	.....	Recovery. Tube removed on 5th day
8	July 25, 1891	R. I. Hospital Dr. C. M. Godding	F.	17 ms.	1 day	1 day	Sepsis. Pertussis 3 wks.	Yes	Yes	2 yr.	Complete	Slight	.....	Recovery. Wore tube 10 days
9	Oct. 8, 1891	Dr. J. W. Keefe	F.	2¼	5 days	12 hours	Sepsis	Yes	....	3–4 yr.	Much	Slight	Sepsis	Death after 5 hours
10	Dec. 15, 1891	Dr. G. E. Carpenter	M.	8	2 days	12 hours	.....	Yes	Yes	8–9 yr.	Complete	Slight	Extension	Death after 58 hours
11	Jan. 2, 1892	Dr. G. E. Carpenter	M.	4½	4 days	48 hours	.....	No	Yes	5–7 yr.	Complete	None	.....	Recovery. Tube worn 6¾ days
12	Jan. 12, 1892	Dr. G. E. Carpenter	F.	2½	24 hours	24 hours	....	Yes	....	2 yr.	Complete	None	Extension	Death after 23 hours
13	Jan. 18, 1892	Dr. G. E. Carpenter	F.	5½	9 days	18 hours	Acute nephritis	Yes	1%	5–7 yr.	Complete	None	Uræmia	Death 9 days after intubation
14	Jan. 27, 1892	Dr. G. S. Eddy, Fall River	M.	4½	9 days	36 hours	.....	Yes	....	5–7 yr.	Complete	Slight	Extension	Death after 45 hours
15	May 16, 1892	Unknown	F.	2	4 days	36 hours	.....	No	....	2 yr.	Complete	None	.....	Recovery. Wore tube 5 days
16	Oct. 30, 1892	Dr. W. H. Bowen	M.	9	Several days	36 hours	.....	No	Much	8–9 yr.	Complete	Much	.....	Recovery. Wore tube 8½ hours. Reinserted temporarily 2 days later
17	Nov. 3, 1892	Dr. J. F. Duffy	F.	2	5 days	2 days	.....	Yes	....	2 yr.	Nearly complete	None	Extension and exhaustion	Death after 43 hours
18	Nov. 8, 1892	Dr. W. W. Hunt	M.	3	5 days	5 days	Sepsis	Yes	Yes	3–4 yr.	Complete	Slight	Sepsis	Death on 6th day
19	Nov. 12, 1892	Dr. W. L. Munro	F.	6	3 weeks	3 days	Influenza 3 weeks	Yes	No	5–7 yr.	Complete	Slight	Pulmonary œdema	Death 11½ hours after operation
20	Nov. 12, 1892	Dr. W. W. Hunt	M.	7	Several days	2 days	.....	No	Yes	5–7 yr.	Complete	None	.....	Recovery. Coughed up tube after 66 hours
21	Nov. 27, 1892	R. I. Hospital Dr. J. W. Mitchell	M.	7	1 week	30 hours	Sepsis	Yes	Yes	5–7 yr.	Nearly complete	Slight	Sepsis	Death after 35 hours
22	Dec. 6, 1892	Dr. W. L. Munro	M.	11 ms.	60 hours	24 hours	Sepsis	Yes	....	1 yr.	Complete	None	Sepsis	Death after 43 hours
23	May 3, 1893	Dr. R. P. Eddy, Jr.	M.	2	3 weeks	36 hours	Sepsis	....	....	2 yr.	Complete	Slight	Sepsis	Death after 27¾ hours
24	May 15, 1893	Dr. R. P. Eddy, Jr.	F.	4½	5 days	48 hours	Sepsis	....	....	5–7 yr.	Complete	Slight	Sepsis and extension	Death after 9½ hours
25	Nov. 18, 1893	Dr. R P. Eddy, Jr.	M.	6	7 days	2 days	Sepsis	Yes	....	5–7 yr.	Complete	None	Sepsis	Death after 13¾ hours
26	Nov. 22, 1893	Dr. R. P. Eddy, Jr.	M.	26 ms.	42 hours	42 hours	Sepsis	Yes	....	2 yr.	Complete	Slight	Sepsis	Death after 41½ hours

SUMMARY OF TWENTY-SIX CASES.

	Died.	Recovered.		Died.	Recovered.
Under 1 year	1	0	5 to 6 years	2	1
1 to 2 years	0	1	6 to 7 years	2	0
2 to 3 years	6	1	7 to 8 years	1	1
3 to 4 years	2	2	8 to 9 years	1	0
4 to 5 years	3	1	9 to 10 years	0	1

18 died and 8 recovered.

Case 4. No urine was voided here for twenty-four hours preceding entrance, nor was any treatment efficient to re-establish renal activity after entering the hospital.

Case 13 also had suppression of urine, coming on two days after the tube had been removed, and when the child was doing well in every way. The family attendant exhausted every means to establish the function of the kidneys without avail.

Case 6 was a very interesting one. The child was desperately ill, and only recovered after a long stay in the hospital. While wearing the tube, it seemed daily, for several days, that he would die, and on one of these days several consultants advised that the tube be removed, lest it be found obstructed. The character of the respiration, which was very rapid, though shallow, and the sound, inclined me to the belief that the tube was clear, and that any extra manipulation would weigh against recovery. The look of a child struggling for air, usually a slower and labored respiration, is far different.

Case 8. Here the tube became plugged on the tenth day. There was cyanosis and labored breathing. Prompt removal of the tube showed its lumen to be nearly occluded by membrane, and was followed by relief. It was not required afterwards.

In Case 16, could I have foreseen the great dysphagia which was to follow intubation, I should have done tracheotomy at the start. It was the only one where there was so great difficulty in swallowing as to cause me to remove the tube for the purpose of feeding — this after it had been in but eight-and-a-half hours. For two days he did well without it, having only moderate dyspnœa; then I was summoned in the middle of the night, and found him struggling desperately for breath. I had no as-

sistance at the time, and the surroundings for immediate tracheotomy were unfavorable, so the intubation tube was reinserted without any assistance, medical or lay. I decided to leave the thread attached for a few minutes, to facilitate removal if necessary. In a fit of coughing the patient pulled it out, and with it came much membrane. This case well illustrates the danger of leaving the thread attached. Fortunately, the tube had so reamed out the trachea that the obstruction was removed. Had anything been required later, I was prepared to do tracheotomy, owing to the O'Dwyer tube interfering with the taking of nourishment.

Cases 17 and 21 were moribund at the time of operation. They were cases where tracheotomy would never have been considered. It seemed doubtful if the latter would survive intubation even. The whole operation did not require fifteen seconds. The child rallied well, and lived a day and a half. These two cases seem to me to justify the claim of intubation to a definite place in surgery not occupied by tracheotomy.

In Case 18 the tube was coughed up, and did not require to be replaced for twenty-four hours. This child finally died from sepsis. In Case 20 the tube was likewise coughed up after sixty-six hours, but was not needed afterwards. The child recovered.

Case 19 was an unusual one. The whole family had been having influenza, and three weeks previous to operation she had an attack. Her symptoms were anorexia, weakness, insomnia, much gastric irritability and fever, with a general eruption of petechiæ, maculæ, papulæ and blotches. The eruption disappeared, but she did not regain strength. I saw her first November 11, 1892. She had been croupy the day before, but in the evening there was less dyspnœa. Same thing

repeated next day. My visit was in the evening, and, as she was breathing pretty well, Dr. Munro and I agreed that it was best not to operate. The following day there was more dyspnœa, increasing towards night, when there was marked cyanosis and retraction. No membrane nor glands. Vomiting constantly. Pulse 145, intermittent. Intubation gave entire relief to dyspnœa, and she soon fell asleep, having had little or no sleep for two or three days. Nourishment taken pretty well. She did well for six hours. We gave a hopeful prognosis. The following morning Dr. Munro was called, and found she had just died, having for the five hours previous grown progressively weaker, and having breathed more and more rapidly, the parents stated. No necropsy was obtained; but it seems probable that death was from pulmonary œdema, following a catarrhal laryngitis attending influenza.

This series of cases has been especially interesting to me, in carefully watching the way in which the children took nourishment. It cannot be too frequently repeated, that once the tube is in place (whether by tracheotomy or intubation) and obstruction overcome, a case of laryngeal diphtheria resolves itself into the systemic disease diphtheria in the vast majority of cases, and now nourishment is the key to the situation, and the nurse holds that key. Everything else, even stimulation, is subsidiary only. I have been surprised to find in how large a proportion of cases the patient, if in a favorable posture (usually lying on the back or side, with feet elevated a little) can swallow with very little difficulty if fed rather slowly. Here everything depends on the tact and patience of the nurse.

In 25 cases of intubation noted, there was

No dysphagia in	10
But little dysphagia in	13
Much at first, none later in	1
Impossible to swallow in	1

So, in 23 out of 25 cases, these children could take nourishment without great difficulty from the first. This leads me to believe that the difficulty in feeding has been overestimated by most writers. However, much care and patience is often requisite on the part of the attendant.

The tube, then, merely overcomes one of the incidental symptoms, if you please. The disease itself must be fought with food and stimulants, the latter in very large quantity often. The only drugs necessary, from our present knowledge, seem to be mercury and iron. Peroxide of hydrogen is useful locally in the throat.

While in most of the cases the introduction of the tube has been easy, there have been enough trying ones to enforce what is well known, that in young children and in densely infiltrated throats it may be attended with much difficulty.

Case 9 was especially difficult; the fauces were greatly swollen, particularly on the left side, making the glottis seem to be far out of the median line. Here the tube was coughed up after two or three hours, and was found plugged with a single piece of membrane, which showed the bifurcation of the trachea.

Almost without exception, after operation the child coughed a few minutes, then fell into a quiet sleep. The relief of dyspnœa was complete in 22 cases, nearly complete in 2 cases, incomplete in 1 case, and none in 1 case.

By consulting the table, the size of the tube used will be seen in many cases to have been larger than that indicated by the O'Dwyer gauge for a child of that age. The development of the child is more important than the age. I always use as large a tube as can be placed with ease, and leave it in as short a time as is consistent with unobstructed breathing.

As far as I know, there has been no permanent impairment of speech. The average time of wearing the tube in the eight cases which recovered was about five and a half days. The percentage of recoveries was 30.8, but this is of little import. To illustrate the fallacy of statistics in a limited number of cases, the first 20 cases show 40 per cent. of recoveries. Again, the last 6 all died. These were all in the country (in East Providence and Rehoboth), and in a locality where the type of cases I have seen has been especially septic and malignant, these being a small part of all the cases of diphtheria I have been asked to see (the others not laryngeal) there during the past few months.

The cause of death has been

Sepsis in	7 cases
Extension to bronchi in	5 cases
Uræmia in	2 cases
Sepsis and extension in	1 case
Sudden heart failure in	1 case
Œdema of lungs in	1 case
Extension and exhaustion in	1 case

Especially true is it that the type of the disease prevailing at the time determines the death-rate after either intubation or tracheotomy. This is apparent especially from the greatly varying percentages reported by operators in Europe, where intubation has been steadily growing in favor during the past three years.

By no means do I believe that tracheotomy is to be driven into disuse by intubation, in relieving the obstructive symptoms of diphtheria. It is a severer way of accomplishing what, in a large proportion of cases, intubation does; but I would never intubate without having the tracheotomy instruments ready for an emergency, as their use may be imperative in any case.

Intubation involves less shock, requires no anæs-

thetic, requires no cutting, and is therefore often consented to by parents who would not allow tracheotomy. In very young children it holds out some hope, where tracheotomy is almost always fatal. Being a less severe measure, it may be resorted to earlier, as well as later, than tracheotomy would be justifiable. There is no wound to heal after the tube is removed.

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